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Original article

Management of pancreatic pseudocysts

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Background: This review analyses the outcome for patients with acute and chronic pancreatic pseudocysts managed in two major referral centres.

Patients and Methods: From 1987 to 1997, 33 patients were treated with either acute ($n = 19$) or chronic ($n = 14$) pseudocysts. Procedures performed included cystgastrostomy (64%), cystduodenostomy (6%), cystjejunostomy (3%), distal pancreatectomy with resection of pseudocyst (12%), laparotomy with external drainage (9%), endoscopic transpapillary stenting (3%) and endoscopic pancreatic duct sphincterotomy with percutaneous drainage of the pseudocyst (3%).

Results: All patients had resolution of their pseudocyst and no patient developed recurrence. There were no deaths in this series. There was a 9% incidence of major complications and a 21% incidence of minor complications. Outcome was excellent in 63% and good in 27% of patients. Two patients (6%) had persistent chronic pain and one patient (3%) had evidence of exocrine pancreatic insufficiency with malabsorption.

Conclusions: Surgical internal drainage of pancreatic pseudocysts can be performed safely with low morbidity and mortality provided patients are carefully selected and their medical management is optimized. Although minimally invasive techniques now offer a variety of treatment options, open surgical drainage is still indicated for a significant number of cases.

Key words: Pancreatic pseudocyst – Pancreatitis – Drainage – Cystgastrostomy – Cystjejunostomy

Pancreatic pseudocysts are localised collections of pancreatic secretions, enclosed in a wall of fibrous or granulation tissue lacking an epithelial lining. This

occurs as a result of pancreatic inflammation and ductal disruption.¹ They are usually a complication of acute or chronic pancreatitis, but may also occur

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secondary to pancreatic trauma. Traditionally, they have been managed by surgical internal drainage but, recently, less invasive techniques have become available.² The aim of this retrospective review was to analyse the aetiology, presentation, management and outcome in a series of patients with symptomatic pancreatic pseudocysts treated in two tertiary referral units.

Patients and Methods

Between 1987 and 1997, 33 consecutive patients (18 males, 15 females) were treated, of whom 17 cases (52%) were tertiary referrals. The mean age was 50.4 years (range, 14–77 years). Using the 1992 Atlanta convention guidelines,³ patients with an acute fluid collection, grossly infected cyst or abscess were excluded from this study. The differentiation between acute fluid collections and acute pseudocysts is arbitrary. Acute fluid collections occur early in the course of acute pancreatitis and lack a wall of granulation tissue, whereas an acute pseudocyst is a collection of pancreatic juice enclosed in a wall of fibrous or granulation tissue which develops four or more weeks after the onset of acute pancreatitis.

Aetiology

Pseudocyst formation was a complication of acute pancreatitis in 19 patients and chronic pancreatitis in 14 patients. Aetiological factors included gallstones (11), alcohol (11), post surgery (2) and hyperlipidaemia (2). Gallstone pancreatitis was more common in the acute group (9/19 acute versus 2/14 chronic), whereas alcohol was more prevalent in the chronic group (6/14 chronic versus 5/19 acute). No aetiology was identified in 7 cases (idiopathic).

Indications for surgery

The most common factor resulting in a decision to operate was pain (55%). Others included radiological evidence of enlargement of the pseudocyst (21%), jaundice (12%) or gastric outlet obstruction (6%). One patient (3%) presented following spontaneous haemorrhage into the pseudocyst 4 weeks after a bout of acute pancreatitis. A further patient (3%) required urgent intervention due to iatrogenic rupture of the pseudocyst during attempted percutaneous aspiration. The mean time from diagnosis to intervention in the acute pancreatitis group was 7 weeks and in the chronic pancreatitis group 12 weeks.

Investigations

All patients were assessed by ultrasonography and 31 (94%) also had a CT scan. ERCP was performed in 14 patients (42%) to demonstrate pancreatic ductal anatomy. Duct-pseudocyst communication was identified in 3 patients. Other investigations included barium meal (18%), OGD (15%), PTC (3%) and HIDA scanning (3%). The median size of pseudocysts that developed following a bout of acute pancreatitis (11.3 cm; range, 6–18 cm) was significantly larger than those in patients with chronic pancreatitis (8.4 cm; range, 3–23 cm) ($P < 0.05$, Mann Whitney U-test).

Management

The principal surgical procedure undertaken was a cystgastrostomy which was performed in 21 patients (64%). Other internal drainage procedures included cystoduodenostomy (6%) and cystjejunostomy (3%). Four patients (12%) underwent a distal pancreatectomy with resection of a chronic pseudocyst. Laparotomy with external drainage was performed in three patients (9%) with acute pseudocysts at 4, 6 and 12 weeks after the onset of acute pancreatitis. In these cases, it was felt the cyst wall was too friable for a safe internal drainage procedure to be performed. One patient (3%) had endoscopic transpapillary stenting of a disrupted pancreatic duct and percutaneous drainage of the pseudocyst, and a further patient (3%) had an endoscopic pancreatic duct sphincterotomy followed by percutaneous drainage of the pseudocyst.

Concomitant procedures were undertaken more frequently in patients with acute pseudocysts. Of the 19 patients with an acute pseudocyst, 5 underwent a cholecystectomy, 2 had a cholecystostomy and 5 had a feeding jejunostomy tube inserted at the time of their primary operation. Only one of the 14 patients with a chronic pseudocyst had a simultaneous cholecystectomy and no feeding jejunostomy tubes were inserted, indicating the more severe nature of the acute illness and the greater likelihood of developing complications due to the primary condition and/or the procedure. One patient in the acute group and two in the chronic group had a surgical biliary drainage procedure performed for biliary duct stricture in addition to operative internal drainage of their pseudocyst.

Results

All patients had resolution of their pseudocyst and no patient developed recurrence. There were no deaths.

Three patients (9%) developed major complications which resulted in prolonged hospital stay. One patient had a wound dehiscence, one developed a chest infection and one had delayed gastric emptying. Seven patients (21%) experienced minor complications which did not delay discharge from hospital. Complications included atelectasis (12%), minor wound infection (6%) and central line sepsis (3%). All patients who had external drainage of their pseudocyst developed a controlled external fistula which closed spontaneously after 1–3 months. There was no difference in post-operative complication rates or outcome when comparing patients with pseudocysts arising after acute or chronic pancreatitis.

Eleven patients (33%) were monitored in ICU for a median of 2 days following surgical intervention. The median hospital stay was 11 days (range, 6–120 days). An excellent outcome with no further symptoms was achieved in 21 patients (63%). A further nine patients (27%) had a good outcome with minimal symptoms, predominantly mild episodes of abdominal pain. Two patients (6%) had persistent chronic pain and one patient (3%) had evidence of exocrine pancreatic insufficiency with malabsorption.

Discussion

Surgical internal drainage of pancreatic pseudocysts was first performed in 1921,⁴ and since then has remained the mainstay of treatment for pancreatic pseudocysts. The recent introduction of minimally invasive techniques, including percutaneous, endoscopic and laparoscopic procedures have further increased the treatment options available and challenged the role of routine surgical intervention.

Most authors recommend intervention for pseudocysts greater than 6 cm in size that persist for longer than 6 weeks.^{1,5} The rationale for this approach is that spontaneous resolution may occur within the first 6 weeks, but is unlikely to happen after this time.^{6,7} In addition, the risk of secondary complications, such as haemorrhage, infection or spontaneous rupture increases with time.⁶ The size of the pseudocyst was an important predictor of the need for operative drainage in a study by Yeo *et al.*¹ They reported that 67% of pseudocysts greater than 6 cm in size required surgical treatment, whereas 40% of those less than 6 cm in size required operative intervention. It is generally accepted that small asymptomatic pancreatic pseudocysts can be managed safely by observation whereas, if the pseudocyst is symptomatic, enlarging or greater than 6 cm in diameter, intervention should be undertaken,

either after a period of maturation for acute pseudocysts, or immediately for chronic pseudocysts.⁸

Three patients in this series with acute pseudocysts were managed with external drainage when the cyst wall was felt to be immature and not capable of holding sutures. This technique is the simplest method of draining a pseudocyst, but is reported to be associated with a mortality rate of 6% and a recurrence rate of 22%.⁹ These figures reflect its predominant usage in complex cases, such as in patients with recent severe acute pancreatitis, and those with complicated pseudocysts, i.e. evidence of infection, haemorrhage or rupture. Understandably, 10–29% of these patients will develop an external fistula.^{10,11}

The majority of the patients in this series underwent surgical internal drainage after a minimum of four weeks from initial presentation. These procedures are associated with a mortality rate of 2% and a recurrence rate of 5%.¹² Internal drainage can be performed into the stomach, duodenum or jejunum. Cystoduodenostomy is usually only performed for small cysts in the head of the pancreas and was undertaken in one patient in this series. The choice of whether to perform a cystgastrostomy or to use a Roux loop of jejunum is usually a matter of the surgeon's preference, with the results from these two procedures comparable.^{13,14} Transgastric cystgastrostomy is a relatively simple approach and is suitable for drainage of most pseudocysts, as they are usually adherent to the posterior wall of the stomach. Cystjejunostomy is felt by some authors to be associated with a lower complication rate and a lower incidence of recurrence.^{8,13,15–17} However, in a meta-analysis of 1020 patients, the cyst recurrence rate was 2.5% after cystgastrostomy and 4.5% after cystjejunostomy.¹⁸ The majority of patients in this series underwent a cystgastrostomy with minimal morbidity and no evidence of subsequent recurrence. The risk of recurrence can be reduced by ensuring that a multiloculated pseudocyst is completely decompressed and by fashioning a wide cyst-gastric anastomosis to ensure adequate drainage. We demonstrated no difference in results after surgery for patients with pseudocysts arising after acute pancreatitis compared with those complicating chronic pancreatitis, and this is consistent with the findings of Andersson *et al.*¹⁹

Distal pancreatectomy with resection of a chronic pseudocyst was performed in four patients in this series. This procedure is ideally suited for pseudocysts in the tail of the pancreas particularly when the normal pancreatic tissue has been replaced by the pseudocyst;⁸ however, sufficient pancreatic tissue must be left to ensure adequate endocrine and exocrine function. Mortality rates of 10% have been reported in association

with pseudocyst excision.¹⁸ On rare occasions a simple cystectomy may be performed.¹⁴

Endoscopic transpapillary stenting is a useful procedure when a communication between the pancreatic duct and pseudocyst can be demonstrated.²⁰ A stent is either passed into the pancreatic duct beyond the level of the pseudocyst communication or manipulated directly into the pseudocyst cavity. The former technique combined with percutaneous drainage of the pseudocyst was used on one occasion in this series with good effect. In a review of 117 patients treated by this method, successful drainage was achieved in 84% with a recurrence rate of 9% over a mean of two years.²

Other minimally invasive procedures now described include endoscopic cystgastrostomy or cystduodenostomy,^{2,20-25} percutaneous external catheter drainage under ultrasound or CT guidance,²⁶⁻²⁹ percutaneous placement of an internal catheter drain^{30,31} and, most recently, laparoscopic procedures for pseudocyst drainage.^{32,33} Unfortunately, these non-operative techniques are not without their complications, especially haemorrhage^{21,34} and sepsis,^{14,35} which may result in death. One drawback of these minimally invasive techniques is that they are not suitable for cases where the cyst wall is more than 10 mm thick.²⁰ Furthermore, in a significant number of acute cases, the cyst contents have solid and liquid elements. In these circumstances, radiological catheters are prone to clog with pancreatic debris, which may result in failure of drainage and secondary infection.¹⁴ In addition, peripancreatic necrosis may be the cause of a persistent pseudocyst. There is no indication for radiological or endoscopic techniques in this situation as the pseudocyst will inevitably recur unless pancreatic necrosectomy is undertaken at the same time as cystgastrostomy. Therefore, we believe that surgical intervention is still very much indicated for a large number of cases and can be very effective in the management of acute and chronic pancreatic pseudocysts.

We have demonstrated that surgical internal drainage can be performed with low morbidity and zero mortality. However, percutaneous drainage, therapeutic endoscopy and laparoscopic techniques now offer a variety of treatment options for symptomatic pancreatic pseudocysts that can be tailored to the needs of individual patients and guided by the expertise available in each centre. We feel that surgical internal drainage represents a very satisfactory treatment option against which less invasive techniques should be judged. However, we recognise that these newer techniques have a definite role and, therefore, recommend a multidisciplinary approach for the management of this challenging complication of acute and chronic pancreatitis in a specialist centre.

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